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EXAMINER	
RUTZ, JARED IAN	

ART UNIT	PAPER NUMBER
2187	

DATE MAILED: 08/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/802,010	CHUNG ET AL.	
	Examiner	Art Unit	
	Jared I. Rutz	2187	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 March 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-17 as originally filed are pending in the pending application. Of these there are 2 independent claims and 15 dependent claims.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the order of writing meta-information and data as recited in claims 2, 3, 12, and 13 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner,

the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. **Claims 2, 3, 12, and 13** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

5. **Claims 2 and 12** recite the limitation "*The method as claimed in claim 11, wherein the meta-information is written after the data of the logical block is written.*" The Examiner is not aware of a portion of the specification which teaches how the meta-information is written after the data of the logical block is written. Accordingly, one of ordinary skill in the art would not know how to make or use the invention as recited in claims 2 and 12.

6. **Claims 3 and 13** recite the limitation "*The apparatus as claimed in claim 1, wherein the data and meta-information of the logical block are simultaneously written.*"

The Examiner is not aware of a portion of the specification which teaches how the meta-information and the data of the logical block are simultaneously written. Accordingly, one of ordinary skill in the art would not know how to make or use the invention as recited in claims 3 and 13.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. **Claims 1-17** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

9. The claims are generally narrative and indefinite, failing to conform with current U.S. practice. They appear to be a literal translation into English from a foreign document and are replete with grammatical and idiomatic errors.

10. **Claim 1** recites the limitation "*a flash memory with regions divided on the basis of a unit that consists of predetermined blocks*". It is unclear from this limitation what is divided, the flash memory or the regions, and it is further unclear if this limitation means that the flash memory or the regions are divided into predetermined blocks, or if the flash memory or the regions are divided into sections that are multiples of predetermined blocks, i.e. the meaning of "on the basis of" is not clear.

11. **Claim 1** recites the limitation "*if a previous write operation has not been performed for the logical block*". It is unclear if this limitation means that there has not previously been a write operation to the logical block, or if there was previously a write

operation issued to the logical block but for some reason it was not performed, i.e., there was some sort of error in a previous write operation.

12. **Claims 2-10** are rejected due to their dependence on claim 1.

13. **Claim 5** recites the limitation "*physical blocks for the logical block number existing according to the write operation*". The meaning of "*existing according to the write operation*" is unclear.

14. **Claim 6** recites the limitation "*based on a latest accessed lower block*". The meaning of a "*lower block*" is unclear.

15. **Claim 6** recites the limitation "*investigating a field of the logical block number of a block allocation table corresponding to the read logical block number*". It is unclear what is investigated. Is the field in the logical block number, and if so, how does a number have a field, or is the field in an entry of a block allocation table corresponding to the logical block number? What corresponds to the read logical block number, the logical block number, the block allocation table, or the field?

16. **Claim 7** recites the limitation "*writing a state value of "1" in the field of the logical block number*". How does a number have a field?

17. **Claim 8** recites the limitation "*the error recovery operation based on the determination on the valid block*". There is insufficient antecedent basis for this limitation in the claim.

18. **Claim 8** recites the limitation "*the other physical blocks*". There is insufficient antecedent basis for this limitation in the claim.

19. **Claim 9** recites the limitation "*the error recovery operation*". There is insufficient antecedent basis for this limitation in the claim.

20. **Claim 10** recites the limitation "*the error recovery operation*". There is insufficient antecedent basis for this limitation in the claim.

21. **Claim 10** recites the limitation "*wherein the error recovery operation is performed during reclaiming the flash memory in which data written in a predetermined unit of the flash memory are moved to a new unit*". It is unclear if "*in which data written in a predetermined unit of the flash memory are moved to a new unit*" is intended to be a limitation on the meaning of "*reclaiming the flash memory*", or if it is a limitation on "*flash memory*", or if it is a special case of "*reclaiming the flash memory*" during which "*the error recovery operation is performed*".

22. **Claim 11** recites the limitation "*if a previous write operation has not been performed for the logical block*". It is unclear if this limitation means that there has not previously been a write operation to the logical block, or if there was previously a write operation issued to the logical block but for some reason it was not performed, i.e., there was some sort of error in a previous write operation.

23. **Claim 11** recites the limitation "*written in a previous physical block corresponding to the logical block the previous write operation has been performed for the logical block*". The meaning of this limitation is unclear.

24. **Claims 12-17** are rejected due to their dependence on claim 11.

25. **Claim 15** recites the limitation "*physical blocks for the logical block number existing according to the write operation*". The meaning of "*existing according to the write operation*" is unclear.

26. **Claim 16** recites the limitation "*based on a latest accessed lower block*". The meaning of a "*lower block*" is unclear.

27. **Claim 16** recites the limitation "*investigating a field of the logical block number of a block allocation table corresponding to the read logical block number*". It is unclear what is investigated. Is the field in the logical block number, and if so, how does a number have a field, or is the field in an entry of a block allocation table corresponding to the logical block number? What corresponds to the read logical block number, the logical block number, the block allocation table, or the field?

28. **Claim 17** recites the limitation "*determining a latest data among data of a specific logical block number detected during reclaiming the flash memory in which data written in a predetermined unit of the flash memory are moved to a new unit*". The meaning of "*a latest data*" is unclear. It is unclear if "*in which data written in a predetermined unit of the flash memory are moved to a new unit*" is intended to be a limitation on the meaning of "*reclaiming the flash memory*", or if it is a limitation on "*flash memory*".

29. In the interest of compact prosecution, the art rejections presented *infra* are made in light of the rejections under 35 USC 112 second paragraph.

Claim Rejections - 35 USC § 102

30. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

31. **Claims 1, 3-4, 11, and 13-14** are rejected under 35 U.S.C. 102(b) as being anticipated by Conley (US 2002/0099904).

32. **Claim 1** is taught by Conley as:

a. *A flash memory access apparatus, comprising: a flash memory with regions divided on the basis of a unit that consists of predetermined blocks, and a flash memory controller.* Paragraph 0038 teaches the architecture of a typical non-volatile data storage system, which includes a controller and a plurality of flash memory devices. Paragraph 0040 explains that flash memory cells are divided into multiple pages.

b. *Wherein when a write operation is requested for a logical block number of the flash memory, the flash memory controller is configured to write data and meta-information in a physical block corresponding to a logical block with the logical block number if a previous write operation has not been performed for the logical block.* Paragraph 0062 discusses a method of programming a non-volatile memory. If there are pages in the physical block that have not been written to, the data is written to those blocks.

c. *And the flash memory controller is configured to perform a write operation for writing the data and the meta-information allocated to the logical block in a new physical block without changing flash memory state information written in a previous physical block corresponding to the logical block if the previous write operation has been performed for the logical block.* Paragraph 0049 shows that when new data is to be written to a logical block corresponding to physical block PBN 0, item 35 of figure 8, which is full, a new physical block PBN 1, item 39 of figure 8, is selected and the new pages are written to PBN 1. Paragraph 0055 shows that an individual page contains data, item 45 of figure 10, and meta-information, item 49 of figure 10. Paragraph 0048 shows that when new pages are written to a logical block, the pages containing the original data are not tagged. The last sentence of paragraph 0047 further emphasizes this by stating "*the writing of the old/new or other flags, as described with respect to FIGS. 6, 7A and 7B, cannot be tolerated.*"

33. **Claim 3** is taught by Conley as:

d. *The apparatus as claimed in claim 1, wherein the data and meta-information of the logical block are simultaneously written.* Paragraph 0055 shows that the data 45 and meta-information 49 are part of the same page. As the data and meta-information are part of the same page they would inherently be written simultaneously, as the system of Conley writes data on a page basis.

34. **Claim 4** is taught by Conley as:

e. *The apparatus as claimed in claim 1, wherein the meta-information includes the logical block number.* Paragraph 0055 shows that overhead data, item 49 of figure 10, contains the logical block number.

f. *And the flash memory state information indicating a state of the physical block as valid, deleted, or invalid.* Paragraph 0055 shows a page contains a time stamp. Paragraph 0050 shows that the time stamp indicates the time the page was written relative to other pages with the same logical address. As shown in paragraph 0052, the time stamps of blocks having the same logical block address and page offset are compared, which allows the system to determine which page is the last written page. Accordingly, this shows what pages are valid.

35. **Claim 11** is taught by Conley as:

g. *A flash memory access method, comprising the steps of: accessing the flash memory and searching for a currently writable physical block if a processor requests a write operation for a specific logical block number of the flash memory.* Paragraph 0062 shows that when a write is performed, an available physical page is found.

h. *And writing data and meta-information in a physical block corresponding to a logical block with the logical block number if a previous write operation has not been performed for the logical block.* Paragraph 0062 discusses a method of

programming a non-volatile memory. If there are pages in the physical block that have not been written to, the data is written to those blocks.

i. *And writing the data and the meta-information in a new physical block corresponding to the logical block without changing flash memory state information written in a previous physical block corresponding to the logical block the previous write operation has been performed for the logical block.* Paragraph 0049 shows that when new data is to be written to a logical block corresponding to physical block PBN 0, item 35 of figure 8, which is full, a new physical block PBN 1, item 39 of figure 8, is selected and the new pages are written to PBN 1. Paragraph 0055 shows that an individual page contains data, item 45 of figure 10, and meta-information, item 49 of figure 10. Paragraph 0048 shows that when new pages are written to a logical block, the pages containing the original data are not tagged. The last sentence of paragraph 0047 further emphasizes this by stating "*the writing of the old/new or other flags, as described with respect to FIGS. 6, 7A and 7B, cannot be tolerated.*"

36. **Claim 13** is taught by Conley as:

j. *The apparatus as claimed in claim 11, wherein the data and meta-information of the logical block are simultaneously written.* Paragraph 0055 shows that the data 45 and meta-information 49 are part of the same page. As the data and meta-information are part of the same page they would inherently be written simultaneously, as the system of Conley writes data on a page basis.

37. **Claim 14** is taught by Conley as:

k. *The method as claimed in claim 11, wherein the meta-information includes the logical block number.* Paragraph 0055 shows that overhead data, item 49 of figure 10, contains the logical block number.

l. *And the flash memory state information indicating a state of the physical block as valid, deleted, or invalid.* Paragraph 0055 shows a page contains a time stamp. Paragraph 0050 shows that the time stamp indicates the time the page was written relative to other pages with the same logical address. As shown in paragraph 0052, the time stamps of blocks having the same logical block address and page offset are compared, which allows the system to determine which page is the last written page. Accordingly, this shows what pages are valid.

Claim Rejections - 35 USC § 103

38. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

39. **Claims 5-6, 8-10, 15, and 17** are rejected under 35 U.S.C. 103(a) as being unpatentable over Conley (cited *supra*) in view of Kim et al. (US 6,381, 176).

40. **Claim 5** is taught by Conley as shown *supra* with respect to claim 1.

41. Although Conley teaches that blocks having the same logical block number can be distinguished by their timestamps, it does not disclose expressly performing a recovery operation.

42. With respect to claim 5, Kim teaches:

m. *The apparatus as claimed in claim 1, wherein the flash memory controller is configured to perform a recovery operation for detecting, during a scanning process, physical blocks for the logical block number existing according to the write operation and for recovering from an error by determining a valid block for the logical block among the detected physical blocks.* Kim teaches at column 6 lines 29-36 that a recovery operation is required if two valid blocks having the same logical block number exist. In the system disclosed by Conley, paragraph 0050 shows that it can be determined which of multiple pages having the same logical block number and page offset is the correct page by comparing the timestamps of the blocks.

43. At the time of the invention it would have been obvious to one of ordinary skill in the art that a recovery operation is necessary in the event of an error during writing.

44. Conley and Kim are analogous art because they are from the same field of endeavor, the design of flash memory systems.

45. The motivation for doing so would have been to determine which block will be erased during a recovery operation (Kim, column 6 lines 30-36)

46. Therefore, it would have been obvious to combine Kim with Conley for the benefit of determining which pages are old and can be deleted to obtain the invention as specified in **claims 5, 6, and 8-10**.

47. **Claim 6** is taught by Conley as:

n. *The apparatus as claimed in claim 5, wherein the scanning process comprises reading a logical block number for each of the physical blocks by investigating the flash memory based on a latest accessed lower block.* Paragraph 0052 shows that when the controller reads the data, it compares the counts in fields 43 and 43' of pages having the same LBA and page offset.

o. *And investigating a field of the logical block number of a block allocation table corresponding to the read logical block number.* Figure 9, discussed in paragraph 0049, which is formed from the data in fields 41 and 41', shows the table that provides a mapping from logical blocks to physical blocks.

48. **Claim 8** is taught by Conley as:

p. *The apparatus as claimed in claim 5, wherein the error recovery operation based on the determination on the valid block includes determining a latest accessed physical block for the logical block number among the detected physical blocks according to priorities set during the scanning process, as the valid block.* Conley paragraph 0050 shows that the most recently written page is determined by checking field 43, the timestamp.

q. *And rewriting flash memory state information written in the other physical blocks as deleted.* Paragraph 0062 shows that updating one or more blocks of data will result in one or more blocks storing the data to be superceded by the new data, and the blocks with superceded data are identified for erasure.

49. **Claim 9** is taught by Conley and Kim as:

r. *The apparatus as claimed in claim 5, wherein the error recovery operation is performed during the initializing the flash memory.* Kim column 4 lines 22-25 shows that when a flash memory is initially used, a logical unit number to physical unit number table is provided. To generate such a table in a system using the timestamps of Conley, it would be necessary to determine which of the pages sharing the same logical block number and page offset is the most recent page.

50. **Claim 10** is taught by Kim as:

s. *The apparatus as claimed in claim 5, wherein the error recovery operation is performed during reclaiming the flash memory in which data written in a predetermined unit of the flash memory are moved to a new unit.* Column 8 line 55 to column 9 line 4 teaches that in a reclaim operation, valid blocks and related metadata are copied to a new unit. In order to determine which blocks are valid in a system using the timestamps of Conley, the timestamps of pages having the same logical block number and page offset must be compared.

51. **Claim 15** is taught by Conley as shown *supra* with respect to claim 11.

52. Although Conley teaches that blocks having the same logical block number can be distinguished by their timestamps, it does not disclose expressly performing a recovery operation.

53. With respect to claim 5, Kim teaches:

t. *The method as claimed in claim 11, further comprising a recovery operation including detecting, during a scanning process, physical blocks for the logical block number existing according to the write operation and of recovering from an error by determining a valid block for the logical block among the detected physical blocks.* Kim teaches at column 6 lines 29-36 that a recovery operation is required if two valid blocks having the same logical block number exist. In the system disclosed by Conley, paragraph 0050 shows that it can be determined which of multiple pages having the same logical block number and page offset is the correct page by comparing the timestamps of the blocks.

54. At the time of the invention it would have been obvious to one of ordinary skill in the art that a recovery operation is necessary in the event of an error during writing.

55. Conley and Kim are analogous art because they are from the same field of endeavor, the design of flash memory systems.

56. The motivation for doing so would have been to determine which block will be erased during a recovery operation (Kim, column 6 lines 30-36)

57. Therefore, it would have been obvious to combine Kim with Conley for the benefit of determining which pages are old and can be deleted to obtain the invention as specified in **claims 15 and 17**.

58. **Claim 17** is taught by Conley and Kim as:

u. *The method as claimed in claim 15, wherein the recovery operation step comprises recovering from the error by determining a latest data among data of a specific logical block number detected during reclaiming the flash memory in which data written in a predetermined unit of the flash memory are moved to a new unit.* Conley paragraph 0050 shows that the most recently written page is determined by checking field 43, the timestamp. Kim column 8 line 55 to column 9 line 4 teaches that in a reclaim operation, valid blocks and related metadata are copied to a new unit. In order to determine which blocks are valid in a system using the timestamps of Conley, the timestamps of pages having the same logical block number and page offset must be compared.

Allowable Subject Matter

59. **Claims 7 and16** are rejected under 35 USC 112 second paragraph and objected to as being dependent upon a rejected base claim, but may be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

60. **Claim 7** recites the limitation "*wherein the investigating the field of the logical block number of the block allocation table includes writing a state value of "1" in the field of the logical block number if the state value has been "0" and detecting that the logical block number has been searched for through the previous physical block during the scanning process, if the state value is "1".*" This limitation in combination with the other recited limitations as best understood by the examiner in light of the rejections under 35 USC 112 second paragraph present *supra*, is not taught or suggested by the prior art of record.

61. **Claim 16** recites the limitation "*And writing a state value of "1" in the field of the logical block number if the state value has been "0" and detecting that the logical block number has been searched for through the previous physical block during the scanning process, if the state value is "1".*" This limitation in combination with the other recited limitations as best understood by the examiner in light of the rejections under 35 USC 112 second paragraph present *supra*, is not taught or suggested by the prior art of record.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jared I. Rutz whose telephone number is (571) 272-5535. The examiner can normally be reached on M-F 8:00 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald Sparks can be reached on (571) 272-4201. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Brian R. Peyton
Primary Examiner

8/21/06

Jared I Rutz
Examiner
Art Unit 2187

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